

CLAIMS

1. An isolated capsaicin receptor polypeptide.
- 5 2. The capsaicin receptor polypeptide of Claim 1, wherein the polypeptide is a VR1 subtype.
3. The capsaicin receptor polypeptide of Claim 1, wherein the polypeptide is a VR2 subtype.
4. The capsaicin receptor polypeptide of Claim 1, wherein the polypeptide comprises an amino
10 acid sequence selected from the group consisting of SEQ ID NO:2, 4, 9, 11, 23, 25, 27, 34, or 36.
5. An isolated polynucleotide sequence encoding a capsaicin receptor polypeptide of claim 1.
6. The polynucleotide sequence of Claim 5, wherein the sequence encodes a VR1 subtype.
7. The polynucleotide sequence of Claim 5, wherein the sequence encodes a VR2 subtype.
8. The isolated polynucleotide sequence of Claim 5, wherein the sequence comprises a
15 sequence selected from the group consisting of SEQ ID NO:1, 3, 5, 6, 7, 8, 10, 20, 21, 22, 24, 26, 33, or 35.
9. A recombinant expression vector comprising the polynucleotide sequence of Claim 5.
10. A recombinant host cell containing the polynucleotide sequence of Claim 5.
- 25 11. A method for producing the capsaicin receptor polypeptide of Claim 1, the method comprising
the steps of:
 - a) culturing a recombinant host cell containing a capsaicin receptor polypeptide-encoding
polynucleotide sequence under conditions suitable for the expression of the polypeptide; and
 - b) recovering the polypeptide from the host cell culture.
- 30 12. An isolated antibody that specifically binds a capsaicin receptor polypeptide of claim 1.

13. A method for identifying compounds that bind a capsaicin receptor polypeptide, the method comprising the steps of:

contacting a capsaicin receptor polypeptide with a test compound; and
detecting specific binding of the test compound to the capsaicin receptor polypeptide.

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14. The method of claim 13, wherein said detecting is by detecting of an alteration of intracellular calcium concentration in the capsaicin receptor-expressing host cell.

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15. A method for detecting a vanilloid compound in a sample, wherein the vanilloid compound has activity in binding a capsaicin receptor polypeptide, the method comprising the steps of:

contacting a sample suspected of containing a vanilloid compound with a eukaryotic host cell expressing a capsaicin receptor polypeptide;

detecting an alteration of a cellular response associated with capsaicin receptor activity in the capsaicin receptor-expressing host cell.

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16. The method of claim 15, wherein the cellular response associated with capsaicin receptor activity is an increase in intracellular calcium concentration.

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17. A pharmaceutical composition comprising a substantially purified capsaicin receptor polypeptide and a suitable pharmaceutical carrier.

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18. A non-human transgenic animal model for capsaicin receptor gene function wherein the transgenic animal is characterized by having an alteration in capsaicin receptor function relative to a normal animal of the same species.

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19. A method of screening for biologically active agents that modulate capsaicin receptor function, the method comprising:

combining a candidate agent with any one of:

(a) a mammalian capsaicin receptor polypeptide;

(b) a mammalian capsaicin receptor-related polypeptide;

(c) a cell containing a nucleic acid encoding a mammalian capsaicin receptor polypeptide;

(d) a cell containing a nucleic acid encoding a mammalian capsaicin receptor-related polypeptide; or

(e) a non-human transgenic animal model for function of a capsaicin receptor gene comprising one

of: (i) a knockout of a capsaicin receptor gene; (ii) an exogenous and stably transmitted mammalian capsaicin

receptor gene sequence; or (iii) a capsaicin receptor promoter sequence operably linked to a reporter gene;
and

determining the effect of said agent on capsaicin receptor function.